

the dose was repeated, and in a few minutes she came to herself and said she was much relieved. She represented the attack as having been preceded by sensations of chilliness and fullness of the head, especially the occiput, but that she did not consider herself much indisposed. She had suffered in the same way several times before, and on one occasion relief was obtained only after five or six hours.

These few cases, taken pretty much at random from my practice in Memphis and New York, will serve to give those who have not tried it some idea of the power of chloroform over certain abnormal conditions of the nervous system; and, perhaps, the publication of them may induce other physicians to give more attention to the subject than they otherwise would have done, in which case my object will have been answered. The largest benefits are likely to result in cases of chill, enabling us, possibly, to overcome by this means the incipient stage of fever, even in its most fatal and epidemic forms; for, if the position taken in my published lectures be the correct one, in regard to the gradual accession of all forms of idiopathic fever, it may be hoped that a remedy, which so completely controls it in the cold stage, can be so used as to very much lessen if not prevent its necessary fatality.

I have not had proper opportunities for testing the efficacy of chloroform internally in cases of poisoning by strychnin, opium, and other articles which are supposed to act by causing congestion in the brain, spinal cord, ganglions and plexuses, but its effect upon congestion induced by the cause of fever is such as to justify the expectation that it will be found useful in these cases also. In gastric and uterine congestion, dysmenorrhœa and puerperal convulsions, I have reason to believe the remedy scarcely less efficient than in the cold stage of fever. And we may hope for good results from its use in apoplexy and paralysis. It should be at once popularized as a remedy for infantile convulsions and sunstroke, which often prove fatal before medical aid can be provided, and also in cases of gastric congestion from the use of cold water when the system is heated by exercise; and certainly no restraint should be imposed upon the sale of chloroform in small quantities by druggists.

ART. IV.—*Consecutive and Indeterminate Hemorrhage from Large Arteries after Gunshot Wounds; with Report of Cases treated by Different Methods; Appreciation.* By JAMES M. HOLLOWAY, M. D.

THE following remarks on hemorrhage after gunshot wounds are the result of four years' experience in positions where I enjoyed the peculiar advantage of attending personally to the management of cases in the

minutest details of treatment, and, at the same time, of observing those details as superintended by a large number of my colleagues. Did I possess the data necessary to furnish a tabular statement of this experience, I have no doubt but the results contained therein would, in the main, accord with those already published in the various journals, abstracts, and retrospects of the present day; leading us to the painful conclusion that hemorrhage, in its varied forms, is one of the most frightful and fatal complications to be encountered by the military surgeon. That it is, at the same time, a most interesting complication is none the less true; eliciting, as it does, the most earnest and assiduous attention, and calling into requisition the best energies of the mind. For the ligation of arteries, and all other means for the arrest of the fatal flow, successfully employed, secure for the surgeon a speedy and lasting claim upon the confidence of all with whom he is brought in contact. But, alas! how often is it the case, after the artery has been secured, and he is ready to flatter himself upon the performance of a brilliant operation, that the ulceration or slough extends, and the bleeding recurs; or the patient fails to react from the shock and anæsthetic influence and the loss of blood, or if reaction is established, the patient is left in so weak and anæmic a condition as to readily take on pyæmia, or, escaping that, yield, more slowly but none the less surely, to the exhausting effects of irritative fever consequent upon the enormous discharge of pus.

In order to be understood when alluding to different forms of hemorrhage it will be necessary to adopt one or the other of the various classifications set forth by writers, and I know of none more suitable than the following, which has been accredited to Prof. Henry Campbell, of Georgia, in his monograph on arteries:—

"In the foregoing paragraphs it has been seen how and at what period various forms of consecutive hemorrhages are occasioned; thus, retarded hemorrhage more frequently comes on within from five to twelve hours after receipt of the wound, and simultaneous with reaction or recovery from the general and local shock; intermediary, within from three to five days, with the dislodgment of the occluding clot and the increased circulation consequent upon advancing inflammation and tumefaction; while secondary takes place from the eighth to the fifteenth day, according to the artery wounded, and is occasioned either by the separation of a slough, opening into the calibre of the vessel previously injured, or by softening of the fibrinous adhesion in the mouth, or by the giving away of the walls of a traumatic aneurism;" and, "indeterminate usually takes place in gunshot wounds at a later period, when the danger of consecutive hemorrhage is supposed to have passed, in twenty, thirty, or forty days, or, indeed, at any time during the advanced stages of a severe wound."

Before proceeding farther I deem it my duty to confess that my acquaintance with the medical literature of the past five years has been confined to the perusal of a few of the leading journals and abstracts, unavoidable circumstances having excluded me from the examination of late editions of standard authors. It may be, therefore, that the views I am about to present as the result of personal experience have been already confirmed and fully set

forth by these latter. If so, my evidence will tend to strengthen that already educed. Certain it is, however, that none of the contributors to leading journals, so far as I can ascertain, have evinced a disposition to depart from the old established rules for the treatment of consecutive and indeterminate hemorrhage involving large arteries. In spite of the frightful mortality, the tendency is still to follow in the beaten track, to adopt with blind faith the aphorism of Guthrie, "that arteries should always be tied if they bleed, and that always at the bleeding point;" or others, less bold, perhaps, insist upon the Hunterian plan, and would vainly claim for it special advantages, such as were never dreamed of by its author. The employment of various styptics, constitutional and local, directly and indirectly, such as opium, quinia, *tr. veratrum viride*, *ferri sulphatis*, *ferri persulphatis*, *ferri perchloridum*, ice, the actual cautery, bandaging and compression, &c. &c., are recommended as adjuvants in the treatment of hemorrhage, but, as yet, no one of these remedies, nor their combined employment, has been set forth, so far as my knowledge extends, as sufficiently effective to justify their adoption in place of the ligature when large arteries are involved. These, with the ligature, are useful, without it, useless. And just here (without claiming originality) it is proper that I should announce the special objects of this paper.

Firstly. The application of the ligature to bleeding vessels, no matter by what plan, is, in many instances, not only futile but very injurious.

Secondly. The proper employment of astringents, both local and constitutional, together with compression, is oftentimes sufficient to arrest hemorrhage from arteries of large calibre until the natural process of repair has set up in and around the bleeding vessel.

Thirdly. A brief notice of this process of repair, and how it plays its part.

1st. If the Hunterian plan for the arrest of hemorrhage be adopted, it fails oftentimes because of the rapidity with which collateral circulation is established, pulsation below the ligature being distinct in a few hours. For example, the following:—

* CASE I. Isaac Herring, private, 53d Regiment, Co. C; occupation, farmer; aged 24 years; general health good; wounded at the battle of Missionary Ridge, Nov. 25, 1863. Gunshot wound (minicé) of left hand; ball entering palmar aspect between first and second metacarpal bones, near their carpal extremities, and lodging under the skin on the dorsum near the ulnar side of the metacarpo-phalangeal articulation of the thumb. The ball was extracted shortly after receipt of injury. He was sent to the rear by rail on the 28th, arriving at the hospital on the evening of the 29th. His wound commenced to bleed on the morning of the 27th at the field infirmary, and continued to bleed at intervals throughout the trip, and upon arrival at the hospital he was nearly pulseless.

Diagnosis.—Intermediary hemorrhage from the deep palmar arch.

Nov. 29. The brachial artery was ligated in its middle third by Dr. H——n, and the wound in the hand was cleansed and carefully dressed.

The pulse at the wrist was felt beating full and strong eight hours afterwards. Extensive inflammation of the whole hand followed, and was treated with cold applications. The hemorrhage did not recur. He was transferred to another post, forty miles distant, Jan. 26th, 1864. At that time the hand and forearm were still somewhat inflamed; pain severe; a deep-seated palmar abscess formed, and was opened; the wrist-joint has become ankylosed. He suffered from a mild attack of erysipelas, extending up the arm and over the face.

April 9. Being possessed of a powerful constitution he has been able to endure an unusual amount of suffering, and, at present, he is walking about his ward. The cicatrices in the hand have recently commenced to ulcerate, destroying the web between the index finger and thumb. His appetite is good. It may be remarked that the pain in the hand has been at times so severe as to resist all means employed for its mitigation, even the endemic application of large doses of morphia.

16th. The ulceration continues; a red line extends along the flexor aspect of the arm; hand oedematous; not painful upon pressure; ordered charcoal and cinchona poultice with a view to its cleansing and stimulant effect. Tension and long-standing inflammation of the tissues have destroyed their vitality.

20th. Ulceration has given place to sloughing with constitutional disturbance. Surrounding tissues red, swollen, and sensitive. Slight arterial hemorrhage occurred this morning. Countenance anxious, and pulse irritable. Ordered nitric acid to wound, and large doses of tr. ferri chlor. and chlorate of potassa.

21st. Neglected to take iron and potassa yesterday; another slight hemorrhage this morning; cleaned wound of slough and clots, and dressed with charpie steeped in turpentine; it seems disposed to take on healthy action.

24th. Hemorrhage recurred this morning at daylight, and was profuse; again at 10 A. M. The slough has extended over the thumb and invaded the metacarpo-phalangeal articulation. Wound cleaned and filled with persulphate of iron in powder. Applied light retentive bandage, and elevated the hand. Ordered opium, 1 gr., to be repeated as often as necessary to secure rest.

29th. Healthy action has returned, and the wound is granulating. The persulphate of iron has formed a firm plug, and is being gradually loosened and pushed out.

May 1. No more hemorrhage; wounds in good condition, and general health improving.

We will not follow the case further. It is very evident that ligation of the brachial, as well as ligation of the femoral, in Case No. II. (see further on), exercised no control over the hemorrhage, for the distinctness of the pulse eight hours afterwards leads to the conclusion that either there was a bifurcation of the artery high up or that the collateral circulation had been speedily established.

If the proceeding of Guthrie be resorted to, it often fails because of either an extension of the slough, the hemorrhage being secondary, or of ulcerative destruction of the arterial coats above the ligature and of the surrounding tissues, as in indeterminate hemorrhage. For example the following:—

CASE II. N. Parker, Corporal, 51st Regiment, Co. "B," occupation farmer; aged 40 years; general health good; wounded at Drewry's Bluff, May 16, 1864. Gunshot wound of left leg, ball entering to the inner side of tubercle of tibia and passing through that bone, made its exit through calf at a point two and a half inches below the wound of entrance. He was in the act of stepping forward on the limb. I saw the patient for the first time on May 23d. Had experienced no untoward symptom since receipt of injury; wound of exit nearly closed by granulation; of entrance, not discharging, and showing no disposition to fill up. Treatment, cold water dressings and rest in recumbent posture.

May 28. Slight hemorrhage from wound of entrance last night; patient states that it was black blood, inducing the belief that it proceeded from the cancellated structure of the bone.

29th. Bled again more profusely last night; decidedly arterial; again at daylight this morning; and again at 9 A. M. after a severe rigor. *Diagnosis.*—Secondary hemorrhage from the posterior tibial in its upper third, occurring on the thirteenth day after receipt of injury. The artery was ligated above and below the bleeding point. The lateral operation, as described by Drutt, was the one adopted; there was much delay in securing the vessel, occasioned by its great depth and the sloughing condition of the surrounding tissues; the incisions were necessarily extensive; shock from operation great; wound of exit in tibia stellated and spicula of bone protruded. Cleansed the wound, approximated its edges and applied roller bandage.

30th. Passed a sleepless night; reacting slowly; suffers from strangury, which was relieved by warm stupes and enemata; limb below the knee warmer than before ligature; temperature still less than normal; applied sand bags; administered three grains of quinia every two hours to ward off chill; nutritious diet and stimulants.

31st. Experienced another chill at 8½ A. M.; reacted without much fever; pulse depressed but regular; complains of severe pain in limb; discharge from wound, thin, dark, and very offensive; dressed with turpentine; prescribed quinia in sedative doses; stimulants and anodynes.

June 1. Seized with another chill at 11 A. M.; hemorrhage recurred, very profuse and exhausting; supposed to be from extension of slough. At 12 M. the femoral artery was ligated as it passes under the sartorius muscle; limb very much reduced in temperature compared with the other; cleansed wound and applied flannel roller from toes upwards, and dressed with Labarraque's solution; suffers severe pain throughout the entire limb. Continue constitutional treatment.

2d, 5½ A. M. Slept at intervals during the night; discharge from wound thin, unhealthy pus mixed with decomposed blood; very offensive; lips of wound sloughing. 12 M. Hemorrhage recurred. At the earnest request of patient the thigh was amputated in its lower third. The main arterial trunk required ligature. He failed to react from the shock of the operation, and died the same evening at 4 o'clock. He retained his intelligence until about one hour before death, and after the last hemorrhage insisted upon the amputation, otherwise I should have declined doing it. Examination of the amputated member showed an extensive slough, involving the artery above and below the ligatures, and the surrounding tissues. The parts above and below the seat of injury were healthy.

CASE III. (Special notes of this case were recorded by Dr. E. M. Senbrook, who performed the operation and continued in charge of patient afterwards. I can only give the prominent facts.)

E. F., soldier; aged about 25 years; general health good; wounded June 2d, 1864. Gunshot wound through left shoulder, ball entering in front and traversing the subclavian triangle. Profuse hemorrhage suddenly occurred on the evening of the 24th of June, twenty-two days after receipt of injury. The wounds had almost closed externally. *Diagnosis.*—Indeterminate hemorrhage from the subclavian artery. The anterior wound was enlarged and a ligature thrown around the artery above the bleeding point; operation performed by candle-light; the sense of touch was of great assistance in finding and securing the vessel; shock following the operation, which was tedious and attended with considerable loss of blood, very great. Another slight hemorrhage occurred a few days after, which proceeded from the transversalis colli; it was tied.

June 6. Patient died to day after another hemorrhage. *Autopsy* (made by myself): the surrounding tissues were completely disorganized; the first rib was fractured; the subclavian artery had sloughed throughout its entire extent and the first part of the axillary was invaded.

As points of interest we have in Case II. well-marked secondary hemorrhage occurring on the thirteenth day, caused by the separation of a slough in the artery, the result either of a contusion during the passage of the ball or of the presence of sharp spicula of bone that were protruding from the posterior aperture in the tibia; and the failure of ligation above and below the seat of injury because of the rapid establishment of collateral circulation. In Case III. we have well-marked indeterminate hemorrhage occurring on the twenty-second day, evidently the result of ulceration of the coats of the artery, for the parts were not in a sloughing condition at the time of the ligation. In both cases, we have great depression of the vital energies following the operation, a natural consequence of loss of blood and the protracted use of chloroform during the delay in finding and securing the bleeding vessel.

Other cases of a similar character could be furnished from my note-book, showing the difficulties and disappointments to be encountered by the military surgeon in his efforts to arrest hemorrhage from large arteries by ligatures. Our text books present us with beautiful guides for the ligation of arteries; and the inexperienced surgeon is induced to believe, when called to a case of hemorrhage, that he has nothing to do but make his incisions, look for the satellites, and pass the needle round the bleeding vessel. On the contrary, however, the very causes which generally give rise to consecutive and indeterminate hemorrhage are sufficient to wipe out all these carefully described landmarks. To increase the confusion, pulsation in the artery ceases oftentimes. For example, on the 24th of June, 1864, I assisted a very intelligent and skilful surgeon in the ligation of the left common carotid for secondary hemorrhage from the internal maxillary. There was great tumefaction of the jaw and cervical region. The hemor-

rhage had been profuse, leaving the patient in a very feeble condition. When I entered the room, the incisions had already been made through the inflamed tissues, but pulsation could not be detected, and it was impossible to find the artery until it was restored by the free employment of stimulants. The artery was finally secured after much delay and loss of blood, but the patient failed to react, and died the next day. On the twentieth of the same month I assisted another of my colleagues in the ligature of the right common carotid for hemorrhage from the internal maxillary. As in the other case there was great tumefaction of the parts, which together with the accidental rupture of a small branch of the superior thyroid vein, caused great delay in securing the vessel; the patient died in less than twenty-four hours. I did not in either case agree with these gentlemen as to the propriety of the treatment, but in one the operation was in progress when I was called; in the other my objections were overruled by a majority. I remember another case in which an attempt was made to ligate the posterior tibial artery by a surgeon who had already performed the operation on ten occasions; after much delay he succeeded in securing the vessel, but the patient died on the table.

In view of the above facts, I contend that as a general rule the Hunterian plan for the arrest of hemorrhage proves futile; and that even when the plan of Guthrie succeeds in arresting the flow, and when ulceration or sloughing of the artery and the surrounding tissues is controlled and nature is disposed to exert her reparative powers, the vital energies of the patient have been reduced so low by the repeated losses of blood previous to and during the protracted search for the artery and by the long-continued use of chloroform, and the severe shock, local and constitutional, consequent thereon, as to leave the way open for the supervention of pyemia or irritative fever, or exhausting diarrhœa, or all of these combined, either or all of which will most surely tend to a fatal issue. If, then, I have properly accounted for the frightful mortality following the ligation of arteries of large calibre for the arrest of consecutive and indeterminate hemorrhage; and if the above cases can be accepted as types—they are certainly corroborated by published statistics, and by the experience of those of my associates who have had the misfortune to encounter hemorrhage in all its varied forms—the question naturally arises, what mode of treatment should be substituted? This brings us to our next proposition.

Secondly. The proper employment of astringents, local and constitutional, together with compression, is oftentimes sufficient to arrest hemorrhage from arteries of large calibre until the natural process of repair in and around the bleeding vessel has set up.

Before citing cases in support of this proposition, I will give a brief history of the circumstances which first directed my attention to it. In 1855 and 6, while a resident student of the Touro Infirmary, and subsequently of the Charity Hospital, New Orleans, I attended a course of lectures delivered

by Dr. Warren Stone, Professor of Surgery in the University of Louisiana. The subject being arterial hemorrhage, he related a case in which the vertebral artery had been wounded by a sharp-pointed weapon. Its ligation being impracticable because of the deep situation and profuse hemorrhage, the graduated compress was resorted to with success. Another case in which the femoral artery had been wounded just below Poupart's ligament, on the field of honor. The necessary instruments for its ligation not being at hand, the patient was conveyed to the city in a furniture wagon, the hemorrhage, in the mean time, being controlled by his finger. After securing comfortable quarters and the requisite instruments, the compression was removed, but no hemorrhage followed. Intelligent and trustworthy assistants were directed to remain constantly at the bed-side of the patient to arrest the hemorrhage in case of its recurrence. Their services were not called into requisition, for the wound healed rapidly and the man recovered without an untoward symptom. Another case was brought before the class (I think it has been published in full) in which the gluteal artery had been opened by an incised wound; a large diffused aneurism resulted occupying the greater portion of the gluteal region. The sac was laid open by a free incision, the clots scooped out and the hemorrhage controlled by the finger. Upon examination it was discovered that the wound in the artery was too near its point of exit from the sacro-sciatic foramen to admit of its ligation, and the graduated compress was substituted with entire success. The facts set forth by these cases are instructive, and guided me in the treatment of the first case of consecutive hemorrhage that came under my care after the breaking out of the late war.

CASE IV. N. Saunders, private, 18th — Reg., Co. —, aged about 21 years; occupation, farmer; general health good; wounded at the battle of Bull's Bluff, Oct. 21, 1861. Gunshot wound of lower third of left leg, fracturing and comminuting the fibula. Three days after receipt of injury, patient rode on horseback from Leesburg to a country house distant about seven miles. I would remark that another soldier was admitted to the hospital at the same time, with a wound very similar to this in external appearance, but not involving the bone. This man was removed by his friends without my knowledge; and in the hurry and confusion consequent upon the admission of so large a number of wounded, the two cases were confounded, Saunders's wound being regarded the less severe; consequently no attempt was made to remove the spicula; cold water dressings were applied and rest enjoined. The case presented nothing worthy of notice until the tenth day, when suddenly profuse hemorrhage occurred. The next morning (Drs. J. T. Gilmore and K. C. Devine in consultation) we decided to enlarge the wound, and, if possible, secure the bleeding vessel. Upon making the incision, the above mentioned condition of the fibula was revealed. The hemorrhage being controlled by tourniquet in popliteal space, about five inches of the fibula were removed by the chain saw. The surrounding tissues were in a disorganized condition, and a fruitless search for the bleeding vessel was made. From the character of the hemorrhage, no doubt as to its proceeding from the posterior tibial can be entertained; though, I confess, such was my

inexperience at the time, I was anxious to regard it as capillary, in order to excuse myself for not finding and securing the artery. The wound was thoroughly cleansed, and filled with pledgets of lint steeped in a strong solution of tannin, and the inflammation subdued by cold irrigation; a roller bandage was applied from the toes to the knee, the foot elevated, and anodynes administered. Repair commenced in due time. There was no return of hemorrhage, and in about two months the patient was able to return to his home.

CASE V. James Egan, private, 10th — Reg., Co. —, native of Ireland; occupation, labourer; aged about 26 years; wounded in the battles around Richmond, June 30, 1862; was admitted into hospital July 2. Gunshot wound obliquely through calf of left leg, in its middle third. When admitted he stated that his wound had been bleeding, and his appearance indicated great loss of blood. He was made comfortable in bed, cold applications were applied, and stimulants ordered. No further notice was taken of the case until the next day, such was the demand for medical aid by those already admitted and who were awaiting operations. *Diagnosis.*—Intermediate hemorrhage from either the posterior tibial or peroneal, perhaps both. Hemorrhage recurred the next day (July 3); before the dressings could be removed and the flow checked, the patient fainted. It was deemed hazardous to attempt ligation, consequently a large, firm compress was applied over the track of the wound, and secured by a roller extending from the toes above the knee; the limb was elevated, and cold irrigation employed. This treatment, together with the use of anodynes and nutritious diet, was persisted in. One or two slight hemorrhages followed, but the patient made a good recovery. I saw him about six months after he left the hospital; one of the wounds had opened, and small spicula of bone were coming away from the posterior surface of the tibia; otherwise his health was good, and he enjoyed free use of his limb. Had I attempted ligation in this case, the patient would certainly have sunk under the operation.

The following case is so interesting and instructive, and, I might add, conclusive an argument in favour of styptics and compression, that, at the risk of appearing tedious, I transcribe it in full from my note-book:—

CASE VI. E. Hayne Davis, Captain and Inspector-General, aged 32 years; profession, lawyer; dark hair and eyes; low stature; weight 150 pounds; general health good; wounded at Fort Stedman, March 25, 1865, by shrapnel, fracturing and comminuting the bones of the right arm and forearm. Amputation of the arm was done on the morning of the 26th, at the field infirmary, supposed to be at the anatomical neck; the condition of the parts at the time of my examination did not admit of a positive opinion on this point. The upper and anterior edge of the incision was situated about one inch below and anterior to the junction of the middle and outer thirds of the clavicle. The patient was removed to comfortable private quarters in Richmond. Repair of the wound was very rapid, and unaccompanied by unpleasant symptoms other than occasional nervous twitching in stump; his appetite remained unimpaired, and there was no appreciable loss of flesh. On the 19th of April he took a long walk; at that time the wound was nearly closed externally. On the evening of the 20th, while sitting in the hall, he experienced tingling sensations in the arm, which were immediately followed by a gush of blood. Medical aid

was speedily obtained; the dressings removed; a small clot near the lower edge of incision was removed, and, after exposing the parts for a short time to the air, a compress was secured in the axilla by means of a roller. The patient informed me subsequently that, for three days before the hemorrhage, the discharge, which before that had almost entirely ceased, increased in quantity and was darker, and accompanied by a constant aching pain in stump. From this we concluded that ulcerative destruction of the tissues was going on, which, in the end, invaded the artery. Dr. E. F. Nichols remained with patient during the night. Hemorrhage recurred at 3 o'clock the next morning, and again at 6 A. M. Upon removing the dressings, extensive extravasation of blood was discovered in the axilla and anterior thoracic region. A consultation was called; present, Prof. A. E. Peticolas, Drs. E. F. Nichols, Thos. Maury, Henry Briscoe, and myself, all of whom agreed as to the diagnosis and treatment of the case, and who were made acquainted with the following notes of the case as I recorded them from day to day:—

Diagnosis.—Indeterminate hemorrhage from an aperture in the axillary artery, occasioned by ulcerative destruction of the coats of the artery and the newly-formed tissues surrounding.

April 21, 10 A. M. Pulse frequent and feeble; cheeks blanched from loss of blood; mind clear and calm; fully aware of the danger of his condition. Having been removed to a large and well-ventilated room, and placed upon the operating-table, a full stimulant was given, compression with the finger and key was made in the subclavian triangle, and the careful administration of chloroform was commenced by Dr. Briscoe; Dr. Maury was in charge of the knife. Before he became fully anesthetized, the dressings were removed and the cicatrix laid freely open. The opening was then enlarged by an incision at right angles to this, extending obliquely downwards and inwards through the skin and great pectoral muscle. A number of large clots were scooped out, and, the cavity being empty, pressure upon the subclavian was removed, to secure a jet of blood to guide us to the bleeding point; the jet was easily obtained, and the blood welled up from the bottom of the cavity, which extended high up under the clavicle. Such was the disorganized condition of the surrounding tissues that no artery could be seen, and it was decided, without delay, that the search should not be prolonged, and that the best chance for the patient would be to plug the cavity with successive layers of lint saturated with a strong solution of persulphate of iron, well packed in, and secured by a figure-of-eight bandage. This was done. Prescribed opium gr. ij, quinia gr. x, to be taken at once.

22d. Has reacted fully; shows loss of blood; slight increase of heat in stump; slept well all yesterday and at night under the influence of the opium and quinia. Applied cold cloths to wound, and prescribed quinia gr. xv, opium gr. iij, in three doses; first to be taken at 11 A. M., and repeat every six hours. Concentrated beef-essence, milk-punch, champagne, and egg-nog *ad libitum*.

23d. Pulse 108; slept well since yesterday, rousing easily; mind lucid; some uneasiness in stump; clots dissolving, and discharge offensive. Applied Labarraque's solution; plugs to remain undisturbed; tongue slightly furred; relishes nourishment and stimulus; continue the quinia without opium; bowels not moved.

24th. Pulse 108; attacked with colic last evening, which was soon relieved by a large enema; annoyed also by uneasiness in stump. Took 2½ grains of opium at 9 P. M., which secured rest, and he awoke this morning bright

and cheerful; skin cool and moist; appetite unimpaired. Soup and soft eggs. No hemorrhage; disorganized blood still exuding.

25th. Pulse 96, improved in volume; rested well during the night without opium; took one toddy at 12 P. M.; dressings undisturbed; disorganized blood still exuding, but its offensiveness is destroyed by the disinfectant; cheerful and hopeful.

26th. Removed the sponge that was placed over the plugs by saturating it with water, after which slight capillary oozing occurred, which proved to be superficial, and proceeded from the lips of the wound to which the sponge had adhered; changed his linen, and made him more comfortable; plugs still undisturbed; offensive discharge not so free, and slightly tinged with healthy pus. Commenced on yesterday at 12 with 15 drops of tinct. ferri perchlorid. three times daily. Continue free diet and stimulants.

27th. After changing outer dressing and bedding on yesterday, was seized with slight rigor, followed by fever, which broke up in a short time, leaving him with a moist skin; is troubled with a cough; slept tolerably well during the night; pulse 120, volume diminished; anemic, but retains his flesh remarkably; insists that he is improving. Removed all the dressings, allowing plug to remain; approximated lips of the wound with adhesive strips. Continue iron, veal cutlets, eggs, and brandy; of the latter he consumes about a pint and a half daily.

28th. Was annoyed by cough all yesterday, which was restrained by simple remedies; experienced another attack of colic, very severe and protracted, requiring powerful anodynes and antispasmodics; pulse 120; discharge of pus very free from stump, also from an opening at upper edge of cicatrix; plugs intact, but being pushed out by the granulations that are forming underneath; appetite still unimpaired; tongue rather dry and coated, resulting from the use of morphia; bowels moved by enema.

29th. Rested well all yesterday and last night, waking this morning refreshed, with a moist and clean tongue; losing flesh from night-sweats and increased drain of pus; plugs loosening from their attachments, and being gradually forced out; pulse the same. Diet, six eggs, soup, and veal; brandy *ad libitum*; increase dose of iron.

30th. The largest and most superficial plug came away last evening without force; another at 12 P. M.; one still remains; discharge of pus healthy, containing flakes of the styptic; pulse unchanged. Continue diet and stimulants.

May 6. Has gradually and steadily improved since last note, until yesterday morning was seized with severe lancinating pain in right side, which persisted, with distressing nervous symptoms, throughout the day; physical exploration of the chest could detect no lesion of the lung, and it is hoped that the attack is purely nervous, though strong suspicion of pyemia is entertained; suffers also with severe pain in the muscles of his jaw during mastication, which he states has been annoying him for several days; pulse irritable; relish for food impaired, which he attributes to the pain in his jaws; the pain in the side was controlled somewhat by anodynes and sinapisms and the external use of chloroform. Continue diet and stimulants.

7th. After pain subsided passed a pleasant night; respiration less painful; starts occasionally in his sleep; although one plug still remains the granulations are rapidly closing over it, the edges of the wound having been approximated by adhesive strips; pulse 112.

9th. Feels languid from colliquative sweats; pain and stiffness of mus-

cles of jaw increased and seriously interfering with his relish for food; no sign of inflammation internally or externally; no evidence of muscular spasm elsewhere; there is a marked increase in the discharge of pus, and it is freely mixed with flakes of the persulphate of iron, inducing the belief that the last plug is being forced out; the almost entire closure of the wound prevents its exit; the track of the wound, which is nearly filled up, and is very superficial, was cleansed by the syringe, and afterwards a weak solution of sulphate of zinc and laudanum was injected, causing considerable pain; the patient was turned upon his side and the shoulder well supported by broad adhesive strips. In the evening his linen was changed and he was removed to another bed, and his shoulders elevated. Prescribed tinct. cinchona and elixir vitriol; continue nourishing diet and stimulants.

10th. Rested well during the night; escaped his usual night-sweats; cleansed track of wound again and repeated the zinc lotion; discharge still tinged with the iron; complained still of pain and stiffness of the jaw; pulse irritable.

I took my departure from Richmond on the 11th, leaving the case in the hands of Drs. Nichols and Petcolas. Mrs. D., the patient's wife, writes me on the 16th of May: "Mr. Davis remained in about the same condition as when you left until last Sunday evening (14th), when he was considerably worried with coughing, phlegm in his throat, pain in his side, and severe pain in his shoulders; every now and then, during the evening and night, his shoulder would quiver and shake. On Monday morning (15th) Dr. N. left all the plasters off, the slit across being swollen and inflamed, and gaping, it having nearly closed before. About 9 A. M. matter commenced running at the end of the slit (the lower opening), which relieved the pain somewhat; the shoulder felt heavy and uncomfortable, though easier than it was on Sunday. Monday night Dr. N. probed the cavity and found the wad of cloth that you and Dr. M. said was there. On close examination he found an end of string showing through the larger cavity; he caught it with forceps and commenced pulling it gently, and in ten minutes got out a wad as large as the last that came out (about the size and shape of a turkey's egg). Dr. N. had continued to syringe the track with warm water; this morning (16th) he found that the channel had closed. Mr. D. slept very well indeed last night, but was slightly under the influence of the morphia in the cough mixture; he complains of some little aching in the shoulder this morning; in every other way he is comfortable. His pulse has been 108 for several days. His jaws were somewhat better last Saturday, but they are sometimes better, then worse again." In a letter from the captain dated May 29th, he observes, "We expect to leave for home in ten days." We have then a history of the case up to the 29th of May, 38 days since the last hemorrhage. The plugs have all been discharged; the wound has filled and is closing rapidly.

In reporting these cases I have intentionally refrained from the selection of wounds of smaller arteries, to which the above plan of treatment is generally applicable, and I have also omitted to mention a number of cases of wounds of larger arteries successfully treated by my colleagues. It is to be hoped that if the attention of surgeons has been specially directed to similar cases, they will not withhold them from the public.

Before proceeding to the third point under consideration I would disabuse the mind of any one who entertains the impression that it is my object

to urge the substitution of compression and styptics exclusively for the ligature. It is sometimes the case when consecutive and indeterminate hemorrhage occurs, that the bleeding vessel is superficial and easily secured; under such circumstances the rejection of the ligature would be criminal. But, as a general rule, I repeat, the causes that give rise to such hemorrhage tend to render the artery friable, obscure, and, in many instances, inaccessible; in such cases a prolonged search with its necessary results, loss of blood, increase in extent of the wound, and the shock, will materially lessen the chances for the recovery of the patient.

We come then to the third point. How does repair take place after gunshot wound of arteries? What part is played in this process of repair by the artery proper and by the surrounding tissues? I would remark in the first place that gunshot wounds involving large arteries sometimes heal by first intention, *i. e.*, without suppuration; though such are exceptional cases. In the March number of the *Lancet* for 1863 a short paragraph announces that "a medal had been awarded to Mr. Colthorp for his report of a case of 'spontaneous closure of the axillary artery after gunshot wound.'" Nothing further is said on the subject, leaving us to conjecture as to the exact meaning of "spontaneous closure," though I presume repair took place by the first intention. Dr. Henry Briscoe, of Maryland, related to me the particulars of a similar wound where there was no hemorrhage after the first few hours and in which the repair was effected throughout the entire track without suppuration; there was no doubt as to the wound of the axillary artery. The following case came under my observation, and I transcribe it from my note-book.

CASE VII. Claude H. Dinkins, corporal light artillery, aged 31 years, merchant, health good, wounded July 18, 1864, near Petersburg by a sharpshooter. Gunshot wound (small minie ball which, after striking him, wounded his companion) through the left shoulder, ball entering behind on a line with and about two inches to the right of the posterior angle of the axillary crease, made its exit in front about one inch above the anterior angle of the axilla. A note from Dr. W. M. Nash, who saw the patient in camp a short time after receipt of wound, is as follows: "The axillary nerves are seriously injured, and indeed the artery does not seem to have escaped, though no hemorrhage has occurred; the impulse in the radial artery is very slight. July 20, near Petersburg.

July 23. I saw the patient for the first time this morning; he states that he has felt the pulse at the wrist occasionally and that at such times he experiences a sense of fulness, as if the arm was filling with blood. He states also that Dr. Palmer, of Florida, has examined him frequently since admission, and he thought he could detect pulsation at the wrist. Sensation perfect in the hand and arm, excepting numbness in the thumb. The wounds of entrance and exit are closed by clots; no discharge; no evidence of inflammation; complains of occasional pain in the hand. Removed to a tent and ordered moist dressings and rest in recumbent posture.

24th. Rested well under influence of morphia. I can discover no pulse at the wrist, nor at any point along the course of the vessel below the seat

of injury. Arm cool, pain not distressing; wound still dry and clots undisturbed. Dr. J. B. Gaston, of Ala., thinks he can discover a feeble pulse at the wrist.

25th. Suffering from nervous twitchings in arm and shoulder, which he mitigates by bathing the parts in cold water; clots dissolving; no sign of pus.

August 4. No change of interest has occurred since above note, the case progressing favourably; no pulse at the wrist nor discharge of pus from the wounds, which are now closed by scab; suffers, at times, with severe pain throughout the limb, or, as he describes it, "along the course of the nerves."

13th. Furloughed to proceed by easy stages to his home. Has not experienced an unpleasant symptom, excepting pain in the limb. The wound has healed throughout its whole track by McCartney's "modelling process," except at the orifice of exit, where on the 12th a small quantity (only a few drops) of pus formed after the scab had been removed through carelessness of the nurse. Pulsation below the seat of injury was not felt by myself at any time during the progress of the case, though repeated examinations were made. Last March I heard by letter that Mr. D. was enjoying excellent health, and that the wounds were entirely healed. Strength and motion of arm somewhat impaired. The long-continued absence of pulsation in the main branches below the seat of injury in this case forms, in my experience, an exception to the general rule.

Secondly.—In some cases, after the wounds have closed and repair seems to be complete, traumatic diffused aneurism results, owing often-times to disturbances in the general health, and sometimes occasioned by premature exercise. A case of this kind came under my observation last August, in which the axillary artery had been wounded. Upon examination, three weeks after receipt of the injury, I detected a distinct bruit under the clavicle; the wound had closed, and until that date no suspicion of aneurism existed, and the patient had not been confined to his bed. His general health being very feeble on account of long exposure to miasmatic influence, it was deemed advisable to send him to the country, with the understanding that he would return in a short time and submit to an operation. He never returned, and in answer to a letter of inquiry his postmaster informs me that he "died four months after his return home from the bursting of an abscess in the upper part of the chest, which discharged a large quantity of blood." In view of the above case, it might be urged by some, as an objection to the treatment of consecutive hemorrhage by compression and other styptics in place of the ligature, that there would be a greater danger of the formation of traumatic aneurism. Admit the truth of this, still the occurrence of so unfortunate a complication would not serve as an argument against this plan of treatment; for the object in view is to rescue the patient from immediate danger, and so husband his strength as to enable him to escape entirely or outlive any complications; and, should an aneurism form, a subsequent operation for

its relief could be performed in sound tissues and on a comparatively sound subject.

Thirdly.—Wounded arteries of large size do not always bleed, even when lying in a mass of sloughing tissues. For example, the following cases, furnished by Dr. J. C. Baylor, of Norfolk :—

CASE VIII. J. W. Dinguid, Lieut. artillery service, wounded by minié ball on the first of June, 1864. Femoral artery severed in its lower third; no consecutive hemorrhage; died June 15th, fourteen days after injury. *Autopsy.*—No effort at repair; gangrene of foot had commenced; the wound in thigh a sloughing mass.

CASE IX. W. D. Thompson, private, 5th cavalry, Co. E, aged 40 years. Gunshot wound (minié) of knee-joint, ball entering outer portion of popliteal space, traversing inner condyle and emerging at inner side of joint. Popliteal artery completely severed; no consecutive hemorrhage; no effort at repair in wound. Wounded May 3d; died May 18th, thirteen days after.

The doctor did not incise and examine the severed ends of the arteries. It would have been a matter of interest if he had ascertained by what means the mouths of the vessels were closed. These cases are exceptions to the general rule.

Fourthly.—In gunshot wounds involving arteries repair usually takes place by granulation. This process is accomplished much sooner than the repair which is going on inside of the wounded artery. This throwing out of plastic lymph and its organization outside and independent of the artery, serves as a provisional obstruction to the escape of blood until the absorption of the secluding clot and the dwindling of the artery to the condition of a cord takes place. This must be the case to a greater or less extent when a ligature has been applied. But we must admit that a ligature which has divided the internal and middle coats and is cutting its way through the external coat by ulceration, must by its presence seriously retard healthy action in the surrounding tissues. We have already seen in the above cases how the ulceration or sloughing, as the case may be, extends beyond the point of ligation, and experience teaches us that hemorrhage is most apt to recur about the time of the separation of the ligature. How much more rapidly and effectually, then, must this repair of the tissues go on when, in place of the ligature, a broad, firm compress is applied, which, instead of dividing and constricting the external coats, merely coaptates them, and which, when properly applied, does not interfere with the granulating process, nay, rather stimulates healthy action in the flabby, or ulcerating, or sloughing tissues. Case VII. furnishes a good illustration of this, where the plugs were actually shoved out by the rapidly-forming granulations. As an evidence of the difference in the rapidity of repair inside and outside of the artery, we might allude to the manner in which traumatic aneurism is formed after gunshot wounds. The wound has healed, as in the case mentioned above; the provisional

plug of healthy granulations has formed; it is still delicate, but sufficient under ordinary circumstances to prevent a recurrence of hemorrhage; the patient takes an undue amount of exercise; the column of blood presses against this plug, which widens and expands, and for the time forms in part one of the coats of the aneurism. The tissues, although incapable of opposing a resisting barrier to the increased impulse of the blood, instead of breaking down at once, gradually retire before the accumulation, and only yield when the attenuated wall is incapable of further expansion. I remember the case of a soldier who was wounded in the leg at the battle of Chancellorsville, May 3, 1863. The posterior tibial in its upper third was involved; the wound had nearly filled by granulations; compression along the track of the wound was employed. There had been no hemorrhage for eighteen days, when an officious attendant probed the wound of entrance with his finger, and upon withdrawing it a large jet of arterial blood followed. Compression was again employed, but the man died about two weeks after of a supervening disease. I regret that circumstances prevented a *post-mortem* examination.

By reference to the details in the treatment of the above cases, the particular remedies used as adjuvants to compression will be found fully described. My preference for the persulphate of iron is great. It is prompt in its action and not irritating. I use it either in powder or in saturated watery solution, generally filling a bleeding cavity with alternate layers of lint and the powder. I have yet to see any bad effects, local or constitutional, from its use. During the summer of 1863 it was used extensively by Drs. Clarke and Baker, of Alabama, as a local application to sloughing wounds. They filled them with the powder, the effect of which was a rapid solidification and separation of the sloughing mass from the surrounding parts; it seemed at the same time to hasten healthy action. In capillary hemorrhage, accompanied by great constitutional disturbance, its application is almost specific. In August, 1864, I was called to a soldier whose wound was bleeding profusely; the integuments on the internal and external aspects of the thigh had sloughed and the muscles were cleanly dissected; the femoral artery was exposed, but uninjured. The muscular interspaces and the whole cavity were filled with the dry powder and a roller bandage applied. I left the further management of the case to one of my colleagues, who informed me that in twenty-four hours all constitutional disturbance ceased, no further hemorrhage took place, and the man was rapidly recovering. I find cold irrigation of great service, when persistently employed, also elevation of the limb when practicable. Opium and quinia, in full doses, are the best constitutional remedies.

LOUISVILLE, KY., June 10, 1865.

ART. V.—*Retroversion of the Impregnated Uterus, with a Case, occurring between the Fourth and Fifth Months of Pregnancy.* By DAVID PRINCE, M.D., of Jacksonville, Illinois. With a wood-cut.

THE discrepancy of opinions found in the text-books upon midwifery, regarding the proper method of replacing retroversion of the impregnated uterus, is a sufficient apology for reporting the following case. Erroneous opinions as to the cause of the malposition may do but little harm, but the importance of correct *practice* cannot be over-estimated.

The cases of persistent retroversion are so rare that many physicians of large practice have not met with a case, and, perhaps, the unsettled practice may be owing to the infrequency of the accidents.

Contrary, however, to the opinion which has been generally entertained, Prof. Hodge, in his magnificent work on Obstetrics (p. 418), says:—

“Retroversion of the uterus is very common during gestation, much more so, we believe, than is generally supposed, especially during the early stages. The author has met with innumerable examples.”

Rigby furnishes, in his *Midwifery* (p. 126), an excellent history of this displacement.

Pressure from distension of the bladder is by many regarded as a cause of retroversion, but this writer thinks that distension of the bladder is an effect and not a cause of this displacement. External violence and the action of the abdominal muscles may press the fundus below the promontory, when it will pass lower to find greater space in the concavity of the sacrum. Then accumulation of urine in the bladder from pressure of the os upon the urethra, and accumulation of feces in the rectum from pressure by the fundus, will tend to fix the uterus in its new position.

This view of the succession of events is supported by the statement that pain, probably from the stretch of uterine attachments, is felt in some of the cases in which the accident occurs suddenly, from action of the abdominal muscles, before those distressing symptoms arise which depend upon distension of the bladder.

The relaxation of the uterine ligaments is plainly necessary to retroversion, both in the unimpregnated and the impregnated state. Without this relaxation the uterus can incline neither forward nor backward. The uterus, again, is so attached to the bladder, that when this organ is full, it must cause the uterus to hug closely to it, and be carried with it, up to the superior strait of the pelvis. It is in this view, clearly impossible that a distended bladder should be the immediate cause of retroversion. The distension of the bladder must, however, put the round and the broad ligaments upon the stretch; and if they fail to retract upon the emptying of the bladder, the uterus has lost its props, and may tumble over, if

forcibly pushed by the intestines, suddenly crowded down by the abdominal muscles.

This explanation has been clearly made by Prof. Meigs, in his *Woman and her Diseases*. In this view a retroversion may occur so soon after the discharge of urine from a distended bladder, that the distress of the retroversion may follow that of the retention of urine so closely as to have no interval in the memory of the patient.

It is easy to conceive that a *retroflexion* might occur in connection with a distended bladder, the fundus of the uterus doubling down upon the lower part of its body and its neck, while the latter is hugged closely upon the posterior surface of the bladder. A retroflexion might also become a retroversion by the straightening out of its long diameter in the process of enlargement in the development of the ovum.

While, then, the accumulation of urine in the bladder may predispose to retroversion by elongating the ligaments; the retroversion may afterwards cause retention by the compression of the urethra between the os uteri and the symphysis pubis. At length, as the os rises into the abdomen above the pubis, the urethra ceases to be compressed, and is only elongated, while the capacity of the bladder may be diminished by the position of the mouth and neck of the uterus. If, however, in this last case, the pressure of the os uteri upon the brim of the pelvis comes below the entrance of the ureters, the bladder may be still greatly distended, as was the condition in Hunter's case, a drawing of which is copied in *Rigby's Midwifery*, and in *Bell's Anatomy*.

Dr. Hodge ascribes the malposition to relaxation of the ligaments from distension of the bladder, a loaded condition of the intestines, and contraction of the abdominal muscles. He thinks, contrary to the opinion of Dewees, that a previously retroverted uterus is frequently impregnated. If spontaneous reposition fails to take place, an early abortion may occur from the continued influence of the tense vagina upon the os uteri.

Treatment.—Dr. Weir, of Glasgow, reduced a retroversion by pressure upon the fundus and a *pull upon the mouth*.

"After much difficulty," he says, "and a great degree of force, and in opposition to the strong and powerful exertions of the patient, which all tended to prevent its admission, I succeeded in getting my hand into the vagina, forced up my finger above the pubes, and reached the mouth of the womb. An assistant, at the same time, got his hand into the rectum, and we had thus the perfect command of the patient. By steadily pushing upward the fundus, and cautiously pulling the mouth and neck of the womb downward, the tumour was gradually raised above the promontory of the sacrum and the uterus reduced to its proper position."—*Glasgow Med. Journ.*, vol. i. p. 268.

Prof. Meigs quotes this treatment with approbation, and makes no criticism of the expedient of pulling down the neck of the uterus. While the length of the uterus is limited to the antero-posterior diameter of the pelvis, the plan of depressing the os may be well enough, but when the os uteri is

pushed firmly against the pubis, and especially when it rides above the pubes, any pull upon the mouth of the womb must be so much force worse than wasted, crowding the fundus all the more firmly into the hollow of the sacrum and requiring a greater lifting force to carry the fundus above the promontory. The period of pregnancy in this case was about the fourth month.

The uterus is uniformly described as forming a lodgment in the hollow of the sacrum, the promontory of which constitutes an impediment to the elevation of the fundus into the abdomen. It would seem, therefore, that the *point* is, to raise the fundus above the promontory. If a pull upon the neck of the uterus crowds the fundus more firmly into the hollow of the sacrum: then this traction is a force which impedes the elevation of the fundus, and is therefore worse than useless. Dr. Rigby, in his *Midwifery*, expresses similar views.

Though this might seem sufficient to settle the chief point of treatment, as consisting in elevation of the fundus without depression of the os, we may quote as authorities in favour of pulling down the os uteri, Burns (*Midwifery*), and Bedford (*Obstetrics*).

Meigs, in his book quoted above, describes and figures a ring upon the end of a rod, by which he lifts up the fundus, and by having two of them, he can hook one upon the cervix and pull down, while with the other he can push upward upon the fundus. He quotes from Moreau a case in which the posterior wall of the vagina was ruptured in the process of reduction, and the woman died.

Perhaps the knowledge of some such catastrophe may have led Denman to enjoin that only mild means should be employed, without describing what those means should be, further than the emptying of the bladder. He thought the enlargement of the ovum favoured the ascent of the uterus. This was probably a mistake as applied to cases in which the fundus becomes impacted in the hollow of the sacrum, favouring adhesion, by the pressure of opposed serous surfaces, as occurs in ovarian tumours.

Ryan, in his *Midwifery*, ascribing retroversion to distension of the bladder, advises to reduce it by two fingers in the rectum and two more in the vagina pressing upon the uterine tumour; very properly omitting the pulling down of the cervix.

Dewees presses upon the fundus with the hand in the vagina until it is above the promontory of the sacrum. The traction upon the os is omitted. The hand is then withdrawn, and a pessary is introduced. It is difficult to conceive how a pessary can be necessary when it must be as difficult for the fundus to get back past the promontory into the pelvis as to get past the same point upward into the abdomen.

Rigby places the patient upon the knees and elbows, and passes two fingers into the vagina and two into the rectum, pressing upon the fundus, and upon the fundus alone. He approves Dewees' recommendation to

bleed. This, however, was written before the use of ether and chloroform was known.

The position upon the knees and elbows, for the purpose of diminishing the tenesmic expulsive effort of the patient, is rendered of no importance by the employment of anesthetics, which completely obviate all expulsive efforts, permitting the employment of the more convenient position upon the back as for lithotomy.

Dr. Hodge advises interference rather than to leave the case to nature. In the earlier period, before the uterus becomes, from its size, impacted in the hollow of the sacrum, he relies upon his "lever pessary," which is fully described in his *Diseases Peculiar to Women*. In the employment of this instrument a gradual replacement is intended. At a later period he places the patient upon her back and elevates the uterus with the fingers of one hand in the vagina while with the other hand pressure is made upon the hypogastrium to aid the descent of the cervix.

According to Dr. Hodge, M. Evart employed a long bougie with a padded extremity, introduced into the rectum.

"The late Dr. Bond, of Philadelphia, contrived an ingenious elevator [figured in *Hodge's Obstetrics*, p. 416] consisting of two curved steel rods surmounted by ivory balls running parallel to each other and united near the handle. In their application, the longer rod is passed into the rectum, and the shorter into the vagina, so as to operate simultaneously upon the fundus and upon the posterior surface of the uterus."

If adhesions render replacement impossible, there is no more rational treatment than to puncture the uterus through the posterior or inferior wall from the vagina, and induce abortion; and if the fetus cannot turn the short corner necessary to get into the vagina, an incision, at the junction of the neck and body between the duplicature of peritoneum and the os, would certainly be the only practicable expedient.

The following case is interesting on account of its history, and also for the facility with which the malposition was reduced with appliances which may be extemporized at any time:—

Mrs. Stont, aged 35, tall and thin, between four and five months in her fifth pregnancy, nothing having ever before gone amiss, became the subject of new and distressing sensations, with retention of urine, between the second and third months of pregnancy. Dr. Christy, an intelligent physician, living near the patient, found a tumour between the vagina and the rectum, and, by passing the strong middle finger into the rectum and pressing upon the tumour, he secured relief from the distressing symptom as long as the pressure was continued. Upon the theory of Meigs this relief arose from the diminished strain upon the ligamentous connections of the uterus while the pressure was applied. No particular time or circumstance could be fixed upon by the patient as the beginning of the malposition. Dr. Christy had failed to reduce the misplacement by pressure by his finger in the rectum, and he concluded to act upon the advice of Denman and wait for the uterus to rise in the progress of the development of the ovum at or before the period of quickening, in the mean time drawing off the urine regularly by the catheter.

Disappointed in this expectation of spontaneous correction, the advice of Dr. J. F. Snyder was obtained, and Rigby's plan was tried unsuccessfully. One operator introduced one finger into the rectum and the other passed three fingers into the vagina, and they both pushed, while the patient was upon her knees and elbows. They attributed their failure to want of length of fingers.

My visit to the patient was January 9th, 1865. The fundus was felt on the perineum by the finger either in the vagina or in the rectum, and no alvine evacuation had been procured for several days.

The cervix of the uterus projected above the pubis, making a hard well-defined projection, and the retention of urine had been exchanged for incontinence, probably because the cervix rising higher not only ceased to compress the urethra, but interfered with the enlargement of the bladder.

Two wooden pessaries or paddles were whittled out of pine boards for pressure upon the fundus of the uterus. One of them, for the rectum, was made one inch by three, and the other, for the vagina, two inches by three. Each was eight inches long, all parts, except the bulged end whittled down, an inch and a half in diameter. The large end of each was covered with three thicknesses of old flannel, which was thoroughly saturated with lard. Two fluidounces of urine were drawn off through a flexible catheter before the commencement of the operation.

The patient having been rendered insensible by the inhalation of pure ether, and placed in the position for lithotomy, the pessary for the rectum was introduced first, the sphincter readily relaxing to receive it, and the other was then placed in the vagina. By holding together the handles of the two pessaries, pressure was made upon the two at the same time, while they were kept from spreading apart.

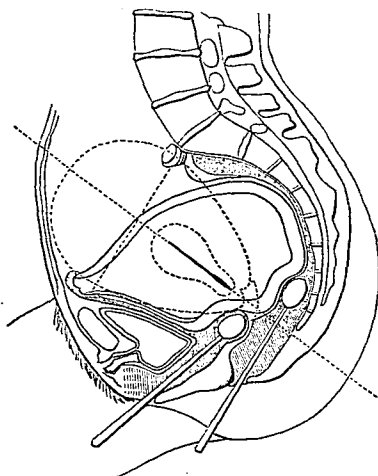
The pressure was made slowly, gradually increased, until the hands holding the pessaries felt a shock and a diminution of resistance. Upon placing a hand upon the abdomen, the fundus was felt rising near the umbilicus. Upon withdrawing the pessaries and introducing the fore and middle fingers of one hand, the neck of the uterus, with an unusually open mouth, was felt in its usual position within easy finger-reach. The peculiar tumour above the pubis had disappeared.

The replacement would doubtless have been easier at an earlier period, but the practitioner was justified in waiting by so high an authority as Denman. It is probable that no operator would now fail to avail himself of the great advantage of anæsthesia, and it is hoped that, if his fingers prove too short, he will employ a wooden pessary, which may be made on the occasion, with a good handle, or a ball, which may be of yarn or of rubber, and that he will not trouble himself about the neck, for if he can get the fundus above the promontory of the sacrum, the neck will come down by the contractility of the vagina.

The following diagrammatic illustration explains the theory of the position of the uterus—the impediment to reposition afforded by the promontory of the sacrum—the inutilty of traction upon the neck of the uterus—and the *modus operandi* of the wooden pessaries or drumsticks. The diminution of the capacity of the bladder is explained by the diagram. At an earlier period, with the os uteri pressing against the pubis below the entrance of

the ureters, the pressure must cause retention and make the frequent and regular introduction of the catheter necessary.

The normal positions of the impregnated and unimpregnated uteri are shown by the curved dotted lines, and the straight dotted lines show the



plane of the superior strait of the pelvis and its axis. The general outline is taken from Hodge's *Diseases Peculiar to Women*.

After consciousness became restored, the patient took some whiskey-punch and a grain of morphia, from which she slept pretty well for several hours, and the bladder continued its functions without the further use of the catheter.

It should be mentioned that the patient had been taking grain doses of morphia for several weeks to quiet her distress. A dose of oil was given, which was vomited. Six hours later two fluidrachms of fluid extract of senna were given, which were also rejected. Pulse, six hours after the operation, of moderate fulness and strength and not much increased in frequency.

The remaining notes of the case were furnished by Dr. Snyder.

Jan. 10, 12 M. (2d day). Found the patient lying on her back with her knees drawn up, under the influence of morphia, and consequently very easy and quiet. She complained of no tenderness on pressure, except at a point just above the pubes. Pulse small, hard, and 120. Considerable thirst; no gastric disturbance; bowels not moved. At 2 P.M., voided

urine freely. Gave pulv. rhei gr. xv, and two hours later commenced the use of veratrum viride; morphia *ad libitum*.

11th, 3 P.M. (3d day). No catharsis; pulse 100; skin soft; no tenderness of the abdomen on pressure. She has taken no morphia since six A.M. Very easy; no nausea; no thirst; slight yellow coating on the tongue; urination free with but slight pain. Gave pulv. rhei gr. x, hydrarg. chlorid. mit. gr. vi, and continued the veratrum viride.

12th, 2 P.M. (4th day). A dose of oil taken in the morning had moved the bowels freely and without much pain. She has taken no morphia since yesterday morning, and is perfectly easy, with a soft skin. Pulse 80; no abdominal tenderness; in a word, we may regard the patient as recovered.

Our patient was, on the 7th of June, delivered of a daughter without any accident. From this, the patient must have conceived about the 1st of September, making her four months and a week pregnant at the time of the reduction.

ART. VI.—*Operations on the Shoulder. I. Three Successful Consecutive Cases of Resection of the Shoulder-Joint. II. Four Successful Consecutive Cases of Amputation at the Shoulder-Joint.* By HENRY F. LYSER, A. M., M. D., Detroit, Mich., formerly Surgeon of the 5th Michigan Vet. Vols.

I. Resection of Shoulder-Joint.

AT this time, when the attention of the profession is so strongly attracted toward the surgery of the war; and when the comparative merits and demerits of amputations and resections are so generally inquired into; I take the occasion to report the histories of three successful consecutive cases of resection of the head of the humerus, which were performed by me during the active campaigns of the Army of the Potomac in 1864.

The accompanying engravings were made from 'Daguerreotypes,' taken at an average period of nine months after the operation.

CASE I. Private R. C. H., of Co. I, 57th Penn. Vols., 3d Div. 2d Corps (residence at Sandy Lake, Mercer Co., Penn.), sustained a compound comminuted fracture of the head of the humerus (left), from a minie ball at the battle of the Wilderness, Va., May 5, 1864. The ball came from the "left flank," and struck the shoulder on its outer aspect at a right angle with its anterior face, and in nearly a horizontal direction. It passed through the deltoid, just below the acromion process, and penetrated to the centre of the head of the humerus, producing a fracture radiating in every direction. The ball, greatly to my surprise, could not be found in the bone, and must have rebounded partially and have fallen out when the clothing was removed. The fracture did not extend below the surgical neck of the humerus. The patient was put under the influence of chloroform, when I proceeded to operate, being skilfully assisted by my operating staff, surgeons

¹ [The figures, as represented in the Daguerreotypes, from which the wood-cuts were engraved, seem to have been reversed.—EDITOR.]